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10/735,934	12/15/2003	Alex Nugent	1000-1207	3732

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EXAMINER	
CALDWELL, MICHAEL J	
ART UNIT	**PAPER NUMBER**
2129	

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/735,934	NUGENT, ALEX	
	Examiner	Art Unit	
	Michael Caldwell	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1-28-04, 8-30-04*, 10-6-05, 2-2-06

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1. This office action is responsive to application 10/735,934 filed December, 15th 2003, which claims priority to a provisional application filed July 18, 2003. Claims 1-20 have been examined.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 15 and 19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The "semi-conducting structures" have not been distinctively pointed out to enable one of ordinary skill to know or use the invention. It is not known whether these are pure semi-conductors, or are doped, or what the intended use or benefits of semi-conducting structures over purely conducting structures are to be considered.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. Phraseology contained within lines 3-4 of the pre-grant publication of this application states "such as, for example." It is not known if silicon dioxide is a required form of insulation layer, or merely a recitation of a possibility.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 9-10, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by McHardy et al. (US Patent 5,315,162, herein referred to as McHardy). Examiner suggests applicant review the entire teaching of McHardy, as its entire teachings have been relied upon. When referring to a column and line number of the reference, the following nomenclature is used: CX, LY-Z representing column X, lines Y-Z.

Regarding claim 1

1. A physical neural network (C 1-6, particularly C 1, L 8-10; also C 2, L 45-54), comprising:

a connection network (neural networks are inherently a connection network, as proper operation requires numerous weighted connections and other requirements) comprising a plurality of molecular conducting connections suspended within a connection gap (C 3, L 43-45) formed between at least one input electrode and at least

one output electrode (C 1-6, particularly C 1, L 44 through C 2, 54 where it discusses the roles of the anode and the cathode), wherein at least one molecular connection of said plurality of molecular conducting connections can be strengthened or weakened according to an application of an electric field across said connection gap (C 1-6, particularly C 1, L 44 through C 2, 54; also C 3, L 44 through C 4, L 7; strengthening or weakening corresponds to the amount of whiskers present in the interconnect channel, likewise the conductivity of that channel)

and a plurality of physical synapses formed from said molecular conducting connections of said connection network (C 1-6, particularly C 2, L 45-54).

Regarding claim 9

9. The physical neural network of claim 1 wherein said at least one input electrode comprises a pre-synaptic electrode and said at least one output electrode comprises a post-synaptic electrode (C 1-6, particularly C 3, L 44-62).

Regarding claim 10

10. The physical neural network of claim 9 wherein a resistance of said molecular conducting connections bridging said at least one pre-synaptic electrode and said at least one post-synaptic electrode is a function of a prior electric field across said at least one pre-synaptic electrode and said at least post-synaptic electrode (C 1, L 29 through C 2, L 4, where it discusses Bernard Widrow's "memistor's" capability to regulate resistance [it does this through the application of an electric field] and also immediately following this discussion where it describes the process of metal migration, and how

metallic whiskers grow to create an ohmic [resistive] contact between electrodes when a DC voltage is applied, the whiskers being the molecular conducting connections)

Regarding claim 14

14. The physical neural network of claim 1 wherein said molecular electrically conducting connections comprise molecular electrically conducting structures suspended within a non-electrically conducting solution. (C 6, L 30-46; non-electrically conducting solution is described therein as the multi-layer thin film technology utilizing polymer dielectrics)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy as applied to claim 1 above, and further in view of Gorelik (US Patent 5,864,835, herein referred to as Gorelik).

Regarding claim 2

McHardy fails to teach wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer.

Gorelik teaches wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer (Gorelik: C 8 L 54 through C 9, L 35).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Gorelik's semiconducting method of an approximation to an artificial biological neuron with this insulation layer so as to maintain charge within the charge carrying layer indefinitely, thus allowing minimal leakage. (Gorelik: C 8 L 54 through C 9, L 35) Combining the electrochemical synapse with a semiconducting signaling device allows for greater flexibility in the application of the physical neural network, where it is to be implemented in different environments for different needs of fault-tolerance or physical structure or electrical requirements.

Regarding claim 3

McHardy teaches wherein the gate of the physical neural network of claim 2 is connected to logic circuitry which can activate or deactivate individual physical synapses among said plurality of physical synapses (McHardy: C 1-6, particularly C 4, L

55 through C 5, L 9; some control mechanism is inherent to controlling this 'controlled forgetfulness' as applied to 'specific synaptic connections').

Regarding claim 4

McHardy teaches wherein the gate of the physical neural network of claim 2 is connected to logic circuitry which can activate or deactivate groups of physical synapses of said plurality of physical synapses. (McHardy: C 1-6, particularly C 4, L 55 through C 5, L 9; some control mechanism is inherent to controlling this 'controlled forgetfulness' as applied to a 'low level back bias to all connections,' constituting a group).

Regarding claim 5

McHardy fails to teach that the molecular conducting connections comprise semi-conducting molecular structures. They are purely conducting structures in McHardy.

Gorelik teaches wherein the molecular conducting connections comprise semi-conducting molecular structures (Gorelik: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Regarding claim 2**)

Regarding claim 6

McHardy fails to teach that the semi-conducting molecular structures comprise semi-conducting nanotubes.

Gorelik teaches wherein the semi-conducting molecular structures comprise semi-conducting nanotubes (Gorelik: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Regarding claim 2**)

Regarding claim 7

McHardy fails to teach that the semi-conducting molecular structures comprises semi-conducting nanowires.

Gorelik teaches wherein the semi-conducting molecular structures comprise semi-conducting nanowires (Gorelik: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Regarding claim 2**)

Regarding claim 8

McHardy fails to teach that the semi-conducting molecular structures comprise semi-conducting nanoparticles. They are purely conducting structures in McHardy.

Gorelik teaches wherein the semi-conducting molecular structures comprise semi-conducting nanoparticles. (Gorelik: C 8 L 54 through C 10, L 63, where it

discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections. Nanoparticles are the atoms and molecules maintaining the connections at the nanometer scale, such as the atoms at the border of the n-type and p-type wells common in semi-conducting devices).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Regarding claim 2**)

Claim Rejections - 35 USC § 103

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy as applied to claims 1 and 9 above, and further in view of Nunally (US Patent 5,615,30, herein referred to as Nunally).

Regarding claim 11

McHardy fails to teach that the physical neural network wherein at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof

Nunally teaches that at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof (Nunally: C 1-7, particularly C 4, L 58 through C 5, L 8).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Nunally's pulse driven training mechanism to be able to update vast amounts of synaptic weights of the network asynchronously with little computational requirements (Nunally: C 1, L 53-67).

Regarding claim 12

McHardy fails to teach the neural network of claim 9 wherein a shape of at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof

Nunally teaches a shape of at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof. (Nunally: C 1-7, particularly C 2, L 40-46 as well as C 4, L 1-21).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Nunally's invention for the reasons stated above (section: **Regarding claim 12**)

Regarding claim 13

McHardy fails to teach an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode.

Nunally teaches an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode (Nunally: C 1-7, particularly C 4, L 58 through C 5, L 8).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Nunally's invention for the reasons stated above (section: **Regarding claim 12**)

Claim Rejections - 35 USC § 103

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy as applied to claims 1 above, and further in view of Widrow (US Patent 3,222,654, herein referred to as Widrow).

Regarding claim 16

McHardy fails to teach the physical neural network of claim 1 wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said molecular conducting connections thereof.

Widrow teaches the ability of the memistor to be used as a multiplier or a linear modulator with the appropriate addition of copper circuitry. (Widrow: C 10, L 65 through C 11, L 10) An increase in frequency f_1 corresponds to the increase in the connection

gap strength. Changing the frequency of the alternating current is still within the scope of the disclosed alternating current of Widrow, which is in direct correlation to the rate of deposition of the electroplating.

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Widrow's method of electrochemical plating. McHardy can be seen as a closer approximation to the current state of the art offering miniaturization and thus the ability to use many of these neurons in parallel with little worry for space constraint.

Claim Rejections - 35 USC § 103

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy, in view of Gorelik and in further view of Widrow.

Regarding claim 17

McHardy teaches a physical neural network (McHardy: C 1-6, particularly C 1, L 8-10; also C 2, L 45-54), comprising:

a connection network (neural networks are inherently a connection network, as proper operation requires numerous weighted connections and other requirements) comprising a plurality of molecular conducting connections suspended within a connection gap (McHardy: C 3, L 43-45) formed between at least one input electrode

and at least one output electrode (McHardy: C 1-6, particularly C 1, L 44 through C 2, 54 where it discusses the roles of the anode and the cathode), wherein at least one molecular connection of said plurality of molecular conducting connections can be strengthened or weakened according to an application of an electric field across said connection gap (McHardy: C 1-6, particularly C 1, L 44 through C 2, 54; also C 3, L 44 through C 4, L 7; strengthening or weakening corresponds to the amount of whiskers present in the interconnect channel, likewise the conductivity of that channel)

a plurality of physical synapses formed from said molecular conducting connections of said connection network (McHardy: C 1-6, particularly C 2, L 45-54).

McHardy fails to teach wherein the physical neural network comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer, and that the physical neural network wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said molecular conducting connections thereof.

Gorelik teaches wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer (Gorelik: C 8 L 54 through C 9, L 35).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Gorelik's

semiconducting method of an approximation to an artificial biological neuron with this insulation layer so as to maintain charge within the charge carrying layer indefinitely, thus allowing minimal leakage. (Gorelik: C 8 L 54 through C 9, L 35) Combining the electrochemical synapse with a semiconducting signaling device allows for greater flexibility in the application of the physical neural network, where it is to be implemented in different environments for different needs of fault-tolerance or physical structure or electrical requirements.

Widrow teaches the ability of the memistor to be used as a multiplier or a linear modulator with the appropriate addition of copper circuitry. (Widrow: C 10, L 65 through C 11, L 10) An increase in frequency f_1 corresponds to the increase in the connection gap strength. Changing the frequency of the alternating current is still within the scope of the disclosed alternating current of Widrow, which is in direct correlation to the rate of deposition of the electroplating.

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Widrow's method of electrochemical plating. McHardy can be seen as a closer approximation to the current state of the art offering miniaturization and thus the ability to use many of these neurons in parallel with little worry for space constraint.

Regarding claim 18

14. McHardy teaches wherein the molecular electrically conducting connections comprise molecular electrically conducting structures suspended within a non-electrically conducting solution. (C 6, L 30-46; non-electrically conducting solution is described therein as the multi-layer thin film technology utilizing polymer dielectrics)

Claim Rejections - 35 USC § 103

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy, in view of Gorelik and in further view of Widrow, and in further view of Nunally.

Regarding claim 20

McHardy teaches a physical neural network (McHardy: C 1-6, particularly C 1, L 8-10; also C 2, L 45-54), comprising:

a connection network (neural networks are inherently a connection network, as proper operation requires numerous weighted connections and other requirements) comprising a plurality of molecular conducting connections suspended within a connection gap (McHardy: C 3, L 43-45) formed between at least one input electrode and at least one output electrode (McHardy: C 1-6, particularly C 1, L 44 through C 2, 54 where it discusses the roles of the anode and the cathode), wherein at least one molecular connection of said plurality of molecular conducting connections can be strengthened or weakened according to an application of an electric field across said connection gap and said at least one pre-synaptic electrode and said at least one post-

synaptic electrode (McHardy: C 1-6, particularly C 1, L 44 through C 2, 54; also C 3, L 44 through C 4, L 7; strengthening or weakening corresponds to the amount of whiskers present in the interconnect channel, likewise the conductivity of that channel)

a plurality of physical synapses formed from said molecular conducting connections of said connection network (McHardy: C 1-6, particularly C 2, L 45-54) and

wherein a resistance of said molecular conducting connections bridging said at least one pre-synaptic electrode and said at least one post-synaptic electrode is a function of a prior electric field across said at least one pre-synaptic electrode and said at least post-synaptic electrode (C 1, L 29 through C 2, L 4, where it discusses Bernard Widrow's "memistor's" capability to regulate resistance [it does this through the application of an electric field] and also immediately following this discussion where it describes the process of metal migration, and how metallic whiskers grow to create an ohmic [resistive] contact between electrodes when a DC voltage is applied, the whiskers being the molecular conducting connections)

McHardy fails to teach wherein the physical neural network comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer, and that the physical neural network wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said molecular conducting connections thereof, and wherein the adaptive neural network is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode.

Gorelik teaches wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer (Gorelik: C 8 L 54 through C 9, L 35).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Gorelik's semiconducting method of an approximation to an artificial biological neuron with this insulation layer so as to maintain charge within the charge carrying layer indefinitely, thus allowing minimal leakage. (Gorelik: C 8 L 54 through C 9, L 35) Combining the electrochemical synapse with a semiconducting signaling device allows for greater flexibility in the application of the physical neural network, where it is to be implemented in different environments for different needs of fault-tolerance or physical structure or electrical requirements.

Widrow teaches the ability of the memistor to be used as a multiplier or a linear modulator with the appropriate addition of copper circuitry. (Widrow: C 10, L 65 through C 11, L 10) An increase in frequency f_1 corresponds to the increase in the connection gap strength. Changing the frequency of the alternating current is still within the scope of the disclosed alternating current of Widrow, which is in direct correlation to the rate of deposition of the electroplating.

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Widrow's method of electrochemical plating. McHardy can be seen as a closer approximation to the current state of the art offering miniaturization and thus the ability to use many of these neurons in parallel with little worry for space constraint.

Nunally teaches an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode (Nunally: C 1-7, particularly C 4, L 58 through C 5, L 8).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Nunally's pulse driven training mechanism to be able to update vast amounts of synaptic weights of the network asynchronously with little computational requirements (Nunally: C 1, L 53-67).

Conclusion / Correspondence Information

Claims 1-20 have been rejected.

The following references have been referred to but not cited. It is suggested applicant review the teachings of these references to gain an understanding of the state of the art at the time of applicant's invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Caldwell whose telephone number is (571) 272-1942. The examiner can normally be reached on Mon-Fri 10:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on (571) 272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

4/18/06
DAVID VINCENT
SUPERVISORY PATENT EXAMINER

MJC
4/17/2006